

Digitizer Update

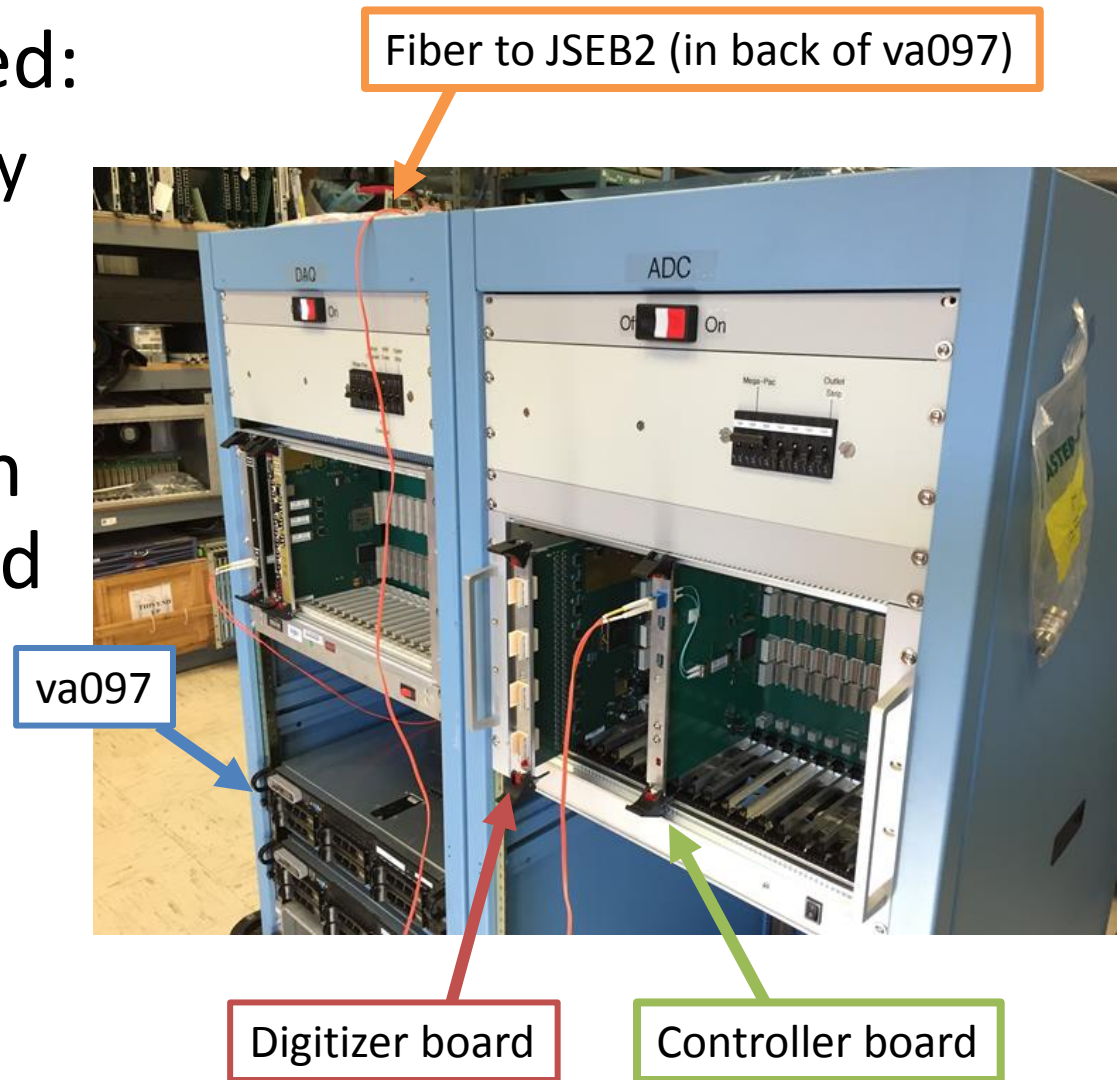
Sarah Campbell

sPHENIX Electronics Meeting

Aug 24, 2016

From Nevis to 1008

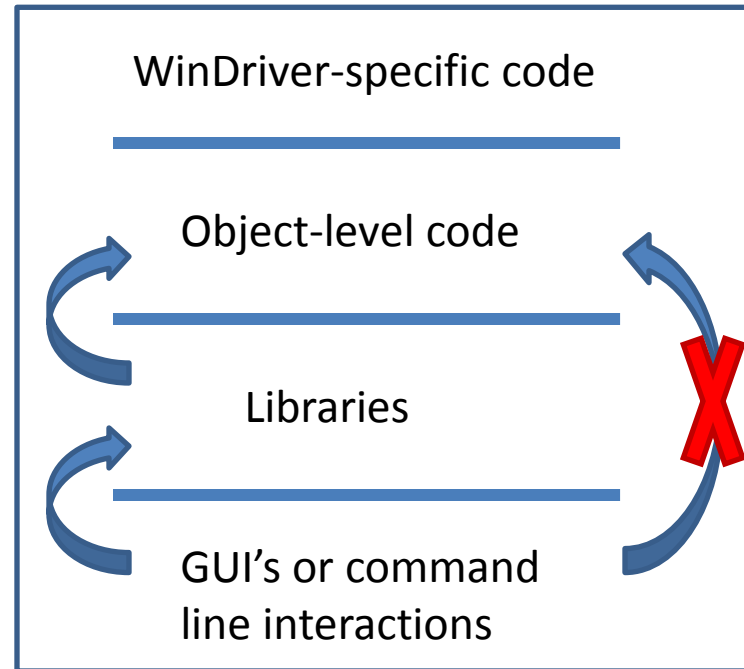
- On Aug 15th delivered:
 - Crate + power supply
 - Controller board
 - Digitizer board
- Ed set up va097 with WinDriver and tested Dcm2 code
- Frank wired in the crate with on the backplane:
 - 12V, V1 = -3.5V,
V2 = 4V, V3 = 2.5V



Picture from J. Haggerty of 1008 setup

Software

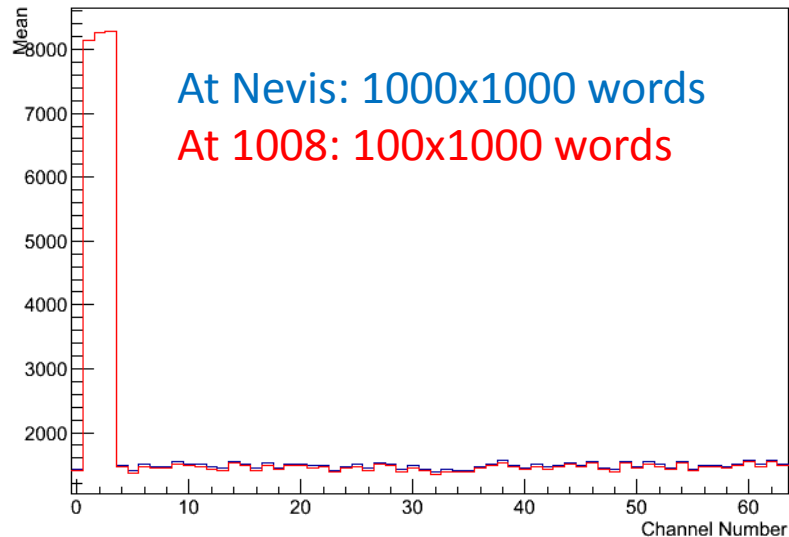
- Used WinDriver's wdwizard to generate some of the WinDriver software for our JSEB2
 - v12.2.0 (at 1008) appears to be identical to v10.21 (at Nevis)
- Got running on va097
- Updated with Chi's improvements
 - i.e. needed digital reset of ADC in startup
- Still need to improve it to make it more object-oriented



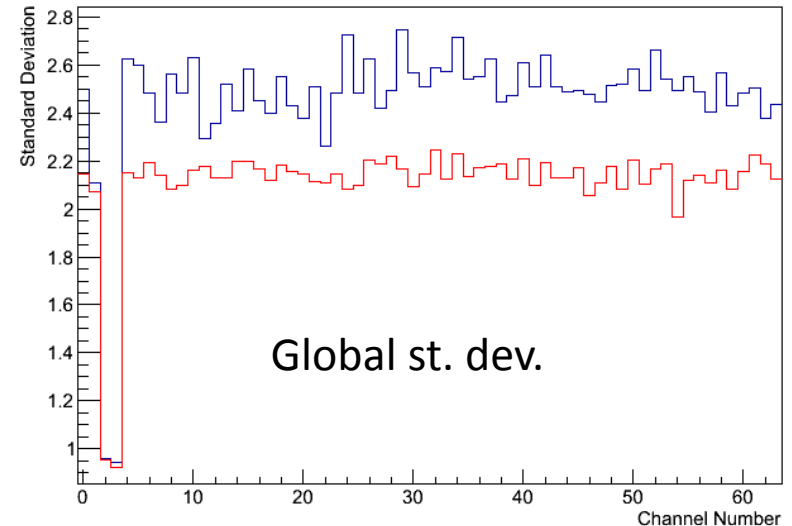
Baseline tests

- Internal L1 trigger, no pulse

AveHist



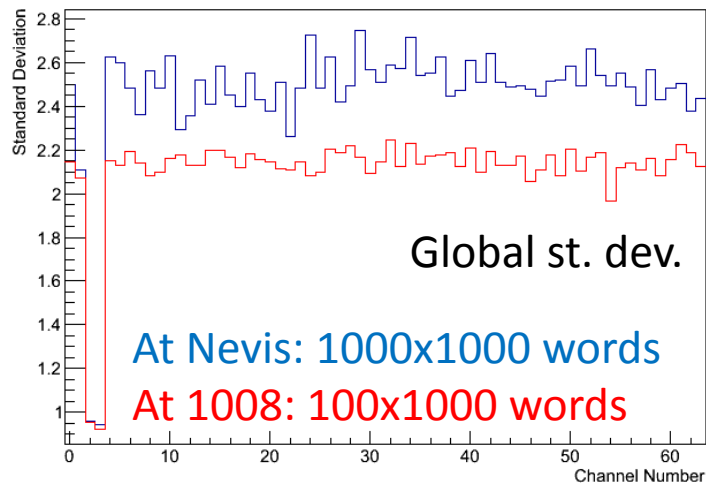
StDevHist



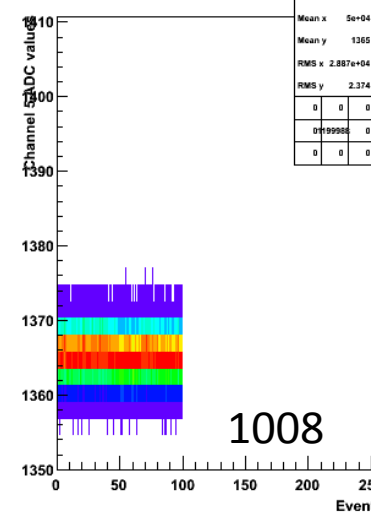
- Ch 1,2,3 not connected → expect to be offset
- Ch 2,3 no power → noise should be less
- 1008 results very similar to Nevis results

Why st.dev. so different?

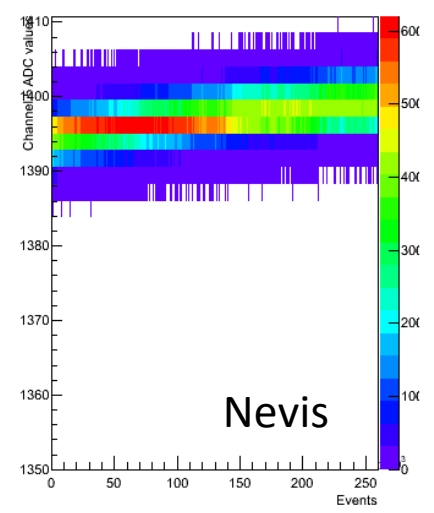
StDevHist



Channel2D_5

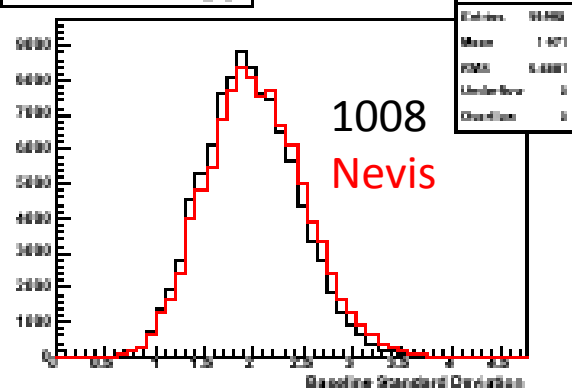


Channel2D_5

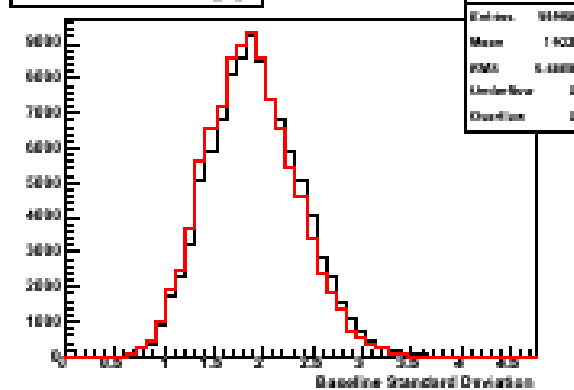


Event-by-event st. dev. Distributions

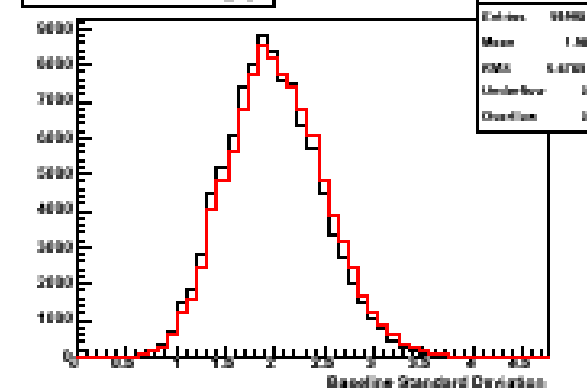
BaselineStDevDistrib_0_0



BaselineStDevDistrib_0_1



BaselineStDevDistrib_0_2



- Overall shifts larger at Nevis
- After subtract event-by-event offsets st.dev. are the same

Output format

- Text files → temporary, i.e. not good, solution
- Current format:
 - Header: 2 hex values
 - Content: 48*8 hex values
 - Footer: 1 value → 0
 - For each event
- Future: something more like PHENIX format so more DCM2 compatible
 - Work with John H, Martin on this

5ffff
9d9a0001

1FCC0593	1FC90590	1FC60590	1FC9058D	1FCB0594	1FC8058D	1FCB0590	1FCC058B
1FCA058D	1FC9058F	1FC70590	1FCB058E	2062204A	20632049	20622049	20632047
20632049	20622049	20612049	2063204B	20622049	2061204A	2062204A	20622048
56E05C8	56A05CB	56C05CA	56A05C8	56E05CA	56E05C7	56D05C8	56F05CD
56905C9	56D05C6	56C05C8	57005CA	5AF05D2	5AE05D2	5B105D0	5B005D2
5B205D1	5AF05D5	5AD05D3	5B205D2	5B005D1	5AF05D5	5AA05D8	5AF05D4
5F305B7	5FA05B8	5F805B9	5F505B7	5F605B8	5F405B8	5F805BB	5F805B8
5F605BB	5F605BD	5F705B8	5F705B9	5D505DA	5D605DE	5D205D7	5D705DC
5D405DD	5D205DB	5D505DD	5D405DE	5D805DB	5D605DD	5D305DB	5D305DA
5950598	5920597	592059B	5950597	592059B	597059F	596059E	59A059A
593059E	5970598	595059D	598059E	5E50607	5E30604	5E30605	5E40604
5E60606	5E40607	5E60605	5E10607	5E10607	5E30606	5E50609	5E30609
60305A2	60F05A7	60705A4	60505B5	5FD05A0	A2F0A37	2C0A31CD	2D873459
2E0134F2	2DC634C2	2D8B3482	2D253417	5FF05EA	5FA05E2	60405E6	5F405EC
5FA05DF	A4E0AEF	2DD33141	3067338C	30EF3417	30C733E0	30843395	30133313
5EB05DE	5F405D1	5E305D0	5F505DC	5E805E3	A9A0AC6	2FCA303F	32C0326D
334332F6	332132B5	32CA325C	325031F2	55E05C7	55C05C6	54F05C5	56005C9
55A05CA	A0F05BD	2C2B05CA	2D9205C7	2DFF05C4	2DD405C3	2D8005C6	2D0405C7
5F005DB	5F305D4	5E605D5	5FC05DE	5E905C9	B400B88	2DD230C1	3009331F
308A338E	305F335C	3019330E	2F903294	61B05C0	62405C1	61B05B2	62005C8
61505BA	BB70BA6	2D72313A	2FAD338E	301A3408	300433BD	2FB33377	2F4032FD
5CD061A	5C60625	5C0061F	5D00623	5BC060C	BAF0C00	2E1C3114	304E3360
30D133DD	30A033A1	304E3341	2FD32DC	5B605EE	57B05ED	5BB05F0	5C205EF
5C105E7	BCC0B81	315F31E4	3483346C	350C34F4	34E134B8	349A3479	34213409
580055E	57C055F	581055F	584055A	583055D	57A055C	57F055F	582055E
57E055E	582055B	57F055C	57E055F	57D0579	57B0578	57D0575	580057A
5800578	57C0577	581057B	582057A	580057C	57E0576	57B0578	57F057D
5D705B6	5D805B9	5DC05B6	5DC05B4	5D605B9	5DA05B4	5DC05B5	5DC05B2
5DB05B5	5D705B5	5DE05B5	5D405B1	5CF0610	5D10611	5D0060F	5D0060D
5CD060D	5CD060D	5CF060C	5CD060B	5CF060B	5CE060B	5CD060B	5CE060F
5CE05A1	5CF05A2	5D105A4	5CE05A5	5CF05A1	5D205A5	5D405A8	5D605A4
5CF05A1	5D005A3	5D205A2	5D505A2	5CE05AB	5CE05A4	5CA05A9	5CC05AA
5C605AB	5C805A9	5CA05AD	5CF05AA	5CA05AC	5CE05AC	5C705AB	5CE05AB
5CB05F2	5CD05F0	5CC05F3	5CD05F4	5CC05F2	5CC05F2	5C805F6	5CE05F5
5CA05EF	5CE05F2	5C705EF	5C905F0	59B0601	59C05FC	59A05FD	59B05FD
59905FB	59905FC	59B05F9	59B05FF	59C05FC	59905FE	59705FA	59A05FB
5FF0581	6010580	6050583	6030582	602057F	6040580	603057E	5FC0580
6030580	6070582	6010582	6010581	60105B1	5FE05B1	60405B2	5FF05B4
5FD05B4	60405AE	60405B2	60305AE	5FF05B0	60205AF	60305B0	5FE05B0
5A005D4	59F05D1	59E05D9	5A305D6	5A005D8	5A005D5	59F05D8	5A105D3
59F05D4	5A005D4	5A005D3	59F05D7	5910608	5920606	5910608	5920608
5930607	5910609	591060C	5920608	5930607	5910609	5920607	5950609
5CE05CB	5CC05CB	5CF05CC	5D405C8	5D005CC	5D105CB	5CD05C9	5CD05CA
5CB05CC	5D005CB	5D005C9	5CE05C9	5E105B6	5DD05B6	5DE05B4	5DE05B2
5DD05B6	5E105B1	5DE05B5	5E005B8	5DD05B3	5DC05B5	5E105B7	5DC05B3
5D6061B	5D90612	5D9061F	5D70618	5D6061A	5D9061C	5D4061C	5D70619
5D5061C	5D7061B	5D20619	5D4061B	5D20619	5D00619	5CF0617	5D30616
5D10612	5D40618	5D60615	5D30617	5D00611	5D10617	5D40618	5D10615

0

Decoding output

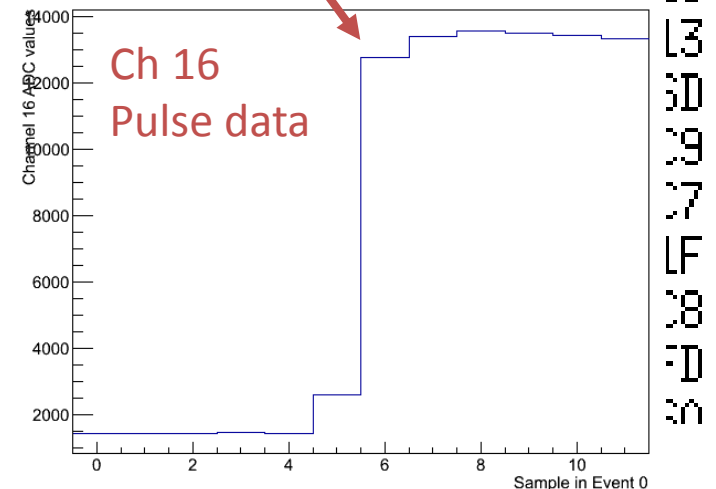
- Header information:
 - 1st value: slot #, ffff
 - 2nd value: clock, event #
- Content consists of 64 channels with 12 adc samples per event

```

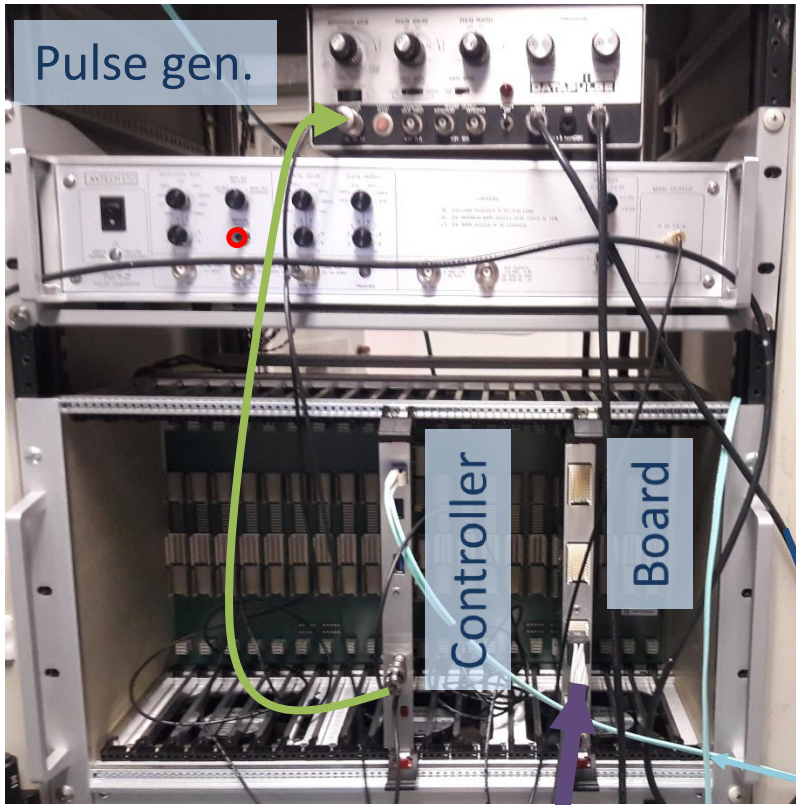
5fff
9d9a0001
1FCC0593 1FC90590
1FCA058D 1FC9058F
20632049 20622049
56E05C8 56A05CB
    
```

```

5E60606 5E40607 5E60605 5E10607 5E10607 5E30606 5E50609 5E30609
60305A2 60F05A7 60705A4 60505B5 5FD05A0 A2F0A37 2C0A31C1 2D87B459
2E0134F2 2DCB34C2 2D8B3482 2D253417 5FF05E0 BEA0AEE0 B0A0AEE0 BEA0AEE0
5FA05DF A4E0AEF 2DD03141 3067338C 30EF341
5EB05DE 5F405D1 5E305D0 5F505DC 5E805E
37 17705E0 7701705E 7000705E 7050715E 777705C
I have written a simple decoder for ease of use 705C
I am more than willing to share it 705C
This is just a stop-gap measure 705C
61505BA BB70BA6 2D72313A 2FAD338E 301A340
600A0E10 600A0E25 600A0E1F 600A0E23 600A0E00
    
```



Pulse gen.



Controller

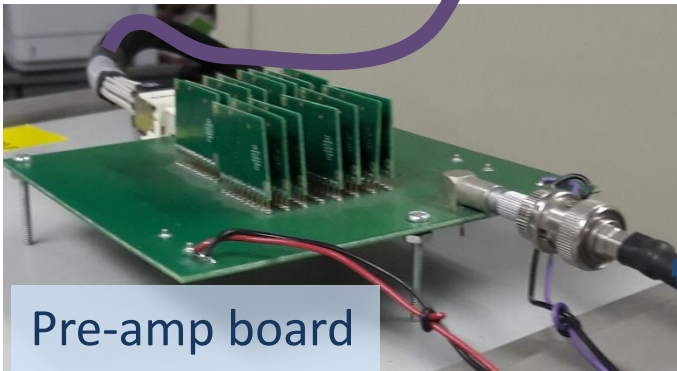
Board

Future work: Internal L1 trigger, pulse studies

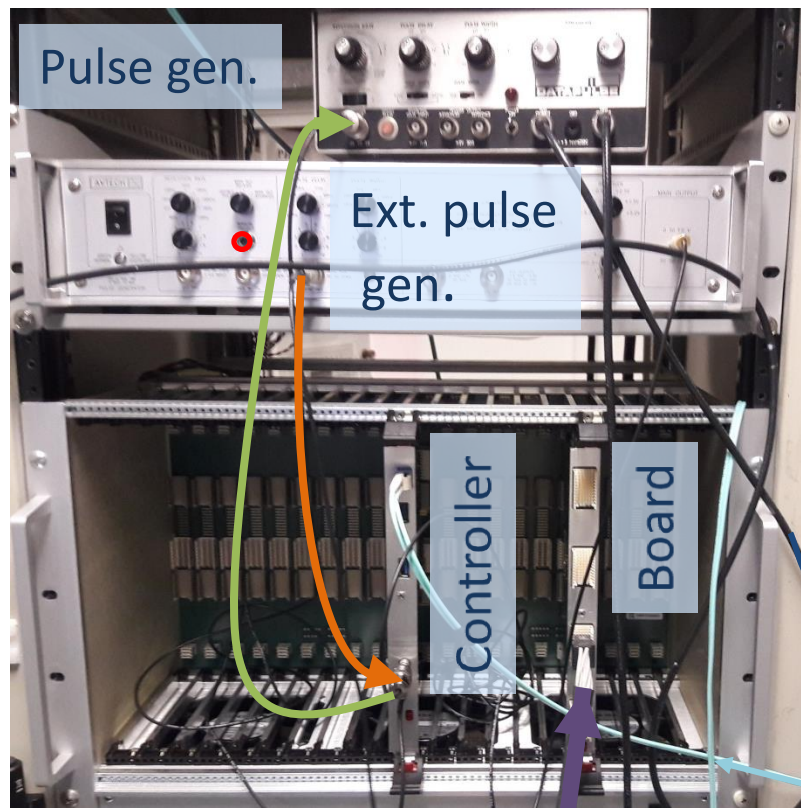
- Signal sent through controller triggers the pulse generator
- Pulse from pulse generator goes through pre-amp board and into digitizer board

Linux box

- Would be able to:
 - Set L1 delay
 - cross talk studies



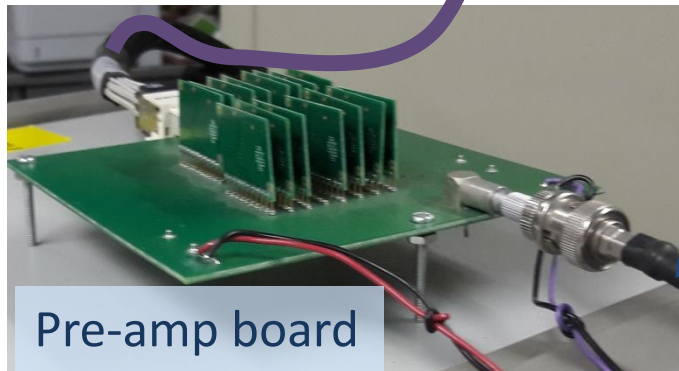
Pre-amp board



Future work: External L1 trigger, pulse studies

- Use Ext. pulse gen. to trigger L1
- Pulse system the same

Linux box



- Would let us study speed, i.e. how fast we can run

How do we want to do this at BNL?

- Needed:
 - Scope
 - pulse generator
 - some way to get pulses into the digitizer...
 - Cables: HBD cable, lemo cables, etc.
 - 2nd pulse generator for ext. trigger